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THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP
100 GALLERIA PARKWAY, NW
STE 1750
ATLANTA, GA 30339-5948

EXAMINER	
DEHGHAN, QUEENIE S	
ART UNIT	**PAPER NUMBER**
1731	

DATE MAILED: 01/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/805,746	PAI, JUI-FEN	
	Examiner	Art Unit	
	Queenie Dehghan	1731	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-59* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-59* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

2. Claim 1-59 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

3. Claim 12 recites the limitation "Ti" in line 2. There is insufficient antecedent basis for this limitation in the claim. There is no mention of Ti in claim 11.

4. Claims 1 and 29 are not clear as to whether the alloy should contain all the metals Cr, Ta, Ti and Ti-Cr or just one of them. The claims are also written with improper Markush language.

5. Claims 8,10,12,14,36,38,40, and 42 are unclear because they fail to indicate that the claimed metal was actually selected, in order for it to have a concentration.

6. Claims 12-27 and 55-58 are unclear because they fail to indicate that the claimed metal was actually selected.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 1, 2, 7, 9, 11, 13, 15, 18-21, 22-30, 35, 37, 39, 41, 43, 46, and 49-59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Umetani et al. (5,171,348) in view of Hagerty et al. (4,747,864), Epstein et al. (5,932,940), Taniguchi et al. (5,676,723), Monji et al (4,271,518), Bai et al. (TW 445424) and Hibino et al. (6,119,485). Umetani discloses a molding die for a glass optical element comprising of

a. A substrate (col. 2 line 16) made of tungsten carbide (col. 3 line 13)

b. first intermediate layer of Ni containing alloy (col. 2 lines 21-26) overlying the substrate,

c. and a second intermediate layer of metal containing alloy overlying the first intermediate layer (col. 2 lines 28-29), comprising of the metals Ta and Ir-Re alloy (col. 4 lines 9-15).

9. Umetani further discloses that an intermediate layer made of material, such as Nickel, allows for excellent grinding processability and cutting processability (col. 3 lines 32-34). Hagerty also teaches the use of a Nickel layer as an intermediate layer between a base mold and a protective coating because the Nickel allows for easy precision-machining into desired shape (col. 7 lines 21-31). In addition, Umetani mentions the use of other metal alloy, such as Ir-Re (col. 4 lines 15) because of its thermal and chemical stability at high temperatures (col. 3 lines 37-37). Epstein also teaches the use of nickel, iridium, and rhenium alloys because of their strength and oxidation resistance (col. 13 lines 6-9). However, Umetani mentions only the use of the metal platinum, in the nickel containing alloy of the first intermediate layer and not any other possible metal alloys. Furthermore, Umetani does not mention an additional layer

above the second intermediate layer nor a varying concentration of metals among the layers. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use alloys containing nickel, iridium, and rhenium, as disclosed by Epstein, in the first intermediate layer of Umetani mold to allow for easy precision machining and chemical and thermal strength of the substrate.

10. Taniguchi discloses a mold for forming an optical element where an intermediate layer on the surface of a mold substrate has a varying concentration that increases with distance from the surface of the mold base (col. 2 lines 54-63). Taniguchi further discloses an intermediate layer that can contain Ti, Cr, or Ta (col. 3 lines 65-66) or any combination thereof. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use any of the metals Ti, Cr, Ta or combinations thereof, as presented by Taniguchi, in the metal containing Ir-Re alloy of the second intermediate layer of Umetani mold to allow for mechanical strength. In addition, it would have been obvious to employ Taniguichi teaching of varying the concentration of a metal in the intermediate layers of Umetani mold, such as Ni in the first intermediate layer and Ta in the second intermediate layer, in order to prevent peeling of the layers when subjected to thermal stress.

11. Regarding claims 1, 29, 28, and 59, Bai teaches of a molding die that uses a buffer layer that serves to increase adhesion between layers in the abstract. Monji teaches the use of a metal layer on top of at least one intermediate layers (col.1 lines 59-63), which forms a molding surface that does not react with glass (col. 2 lines 3-7). Furthermore, Monji teaches the use of two or more intermediate layers to prevent the

diffusion of active metals from the substrate to the molding surface as well as to strengthen adhesion between the top layer and the substrate (col. 2 lines 26-30). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Monji two or more intermediate layers, where one serves as Bai's buffer layer, and a top layer, which serves as a passivation film over the intermediate layer(s), as described by Monji, in Umetani mold in order to prevent reactivity with glass in the molding process and to prevent diffusion of metals and strengthen adhesion.

12. Regarding claim 29, Hibino teaches the importance of an intermediate layer to be comprised of a component that is present in the layer beneath it and a component present in the layer above it, such as a substrate and a protective layer (col. 3 lines 18-20) to allow for adhesion between the layers (col. 2 lines 56-58). Similar to Umetani, Hibino teaches the used of a layer comprising of Ir, Re and alloys thereof (col. 3 lines 54-62). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use two or more intermediate layers, as suggested by Monji, where one of the layers is a buffer layer as suggested by Bai, located between the first and second intermediate layers, comprising of Ir-Re alloy, since it is a common component with the layer above it and below it, as mentioned by Hibino, in order to have proper adhesion of the first and second intermediate layers.

13. Regarding claim 1, it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the metals Ir, Re, and Ni, as disclosed by Epstein, in the first intermediate layer of Umetani, the varying concentrations of metal in the first and second intermediate layers, as disclosed by Taniguchi, in Umetani mold,

and the passivation layer of Monji in Umetani mold in order to allow for the cost effective manufacturing of a molding die that has easy precision machining, strength and chemical stability with glass.

14. Regarding claim 29, it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the metals Ir, Re, and Ni, as disclosed by Epstein, in the first intermediate layer of Umetani, the varying concentrations of metal in the first and second intermediate layers, as disclosed by Taniguchi, the passivation layer of Monji, and the Ir-Re alloy buffer layer as suggested by Bai and Hibino in Umetani mold in order to allow for the cost effective manufacturing of a molding die that has easy precision machining, good adhesion between layers, strength and chemical stability with glass.

15. Regarding claims 7, 18, 35, 46, and 49, Monji further demonstrates examples of various intermediate layers that have varying thickness in Table 1 (col. 4 lines 19-21), such as 0.1μm for the first and second intermediate layer and 0.02μm for the buffer layer. Hibino also recites an example where the intermediate layers for a glass-molding die has thickness of 0.2-0.3μm (col. 15, line 19). Regarding claims 22 and 53, Hagerty recites an example where the passivation film has a thickness of 1μm (col. 12 lines14-15). It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize 0.1μm thick first and second intermediate layers and a 0.02μm thick buffer layer, as mentioned by Monji and a 1μm thick passivation film as mentioned by Hagerty in Umetani mold in order to ensure proper bond strength among the intermediate layers and to maintain a smooth surface on the passivation film.

16. Regarding claims 9, 11, 13, 15, 37, 39, 41, and 43, both Taniguchi and Hibino teach of intermediate layers comprising of metals such as Ti, Cr, Ta and combinations thereof (col. 3 lines 65-67, col. 4 lines 20-24, respectively). If any of the above metals are selected, it would have been obvious to one of ordinary skill in the art at the time the invention was made that the concentrations of the selected metal is higher than 0 at%. In addition, it would have been obvious to one of ordinary skill in the art at the time the invention was made that any metal alloy would have a certain level of metal impurities such as Cr, Ti, and Ta that is higher than 0 at%.

17. Regarding claims 19-21, 23-27, 50-52, and 54-58, Umetani discloses nitrides in the passivation or protection layer, such as Titanium nitride in Table 8. Bai teaches a protection film comprising Ir-Re alloy with chromium nitride, tantalum nitride or other nitrides in the abstract. Taniguchi also teaches of a layer that comprises of not only the metals Ti, Cr, Ta, but also nitrides and combinations thereof (col. 3 line 67). It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize a protection layer such as the Ir-Re alloy with tantalum nitride layer of Bai, that serves as passivation layer of Monji on top of the Ta containing Ir-Re alloy layer of Umetani mold in order to protect the mold from deformations when used in pressing glass. Additionally, it would have been obvious to one of ordinary skill in the art at the time the invention was made to understand that any of the metals disclosed by Taniguchi can be used in the intermediate layer and any of the nitrides disclosed by Bai and Umetani can be used in passivation layer simultaneously and respectively, such as

Ta in the second layer and tantalum nitride in the passivation layer, in order to offer compatibility and proper adhesion between the layers, as taught by Hibino.

18. Claims 5-6, 16-17, 33-34,44-45, and 47-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Umetani et al. in view of Epstein et al., Taniguchi et al., Hagerty et al., Monji et al, Bai et al., and Hibino et al., as applied to claims 1 and 29 above, and in further view of Kuribayashi et al. (4,685,948). Umetani and Epstein disclose intermediate layers on a substrate comprising of Ir-Re alloy. However, neither mention a ratio of Ir to Re in the alloy. Kuribayashi discloses an example of a mold for pressing glass optical elements covered with a press surface film (col. 2 lines 48-53) of Ir-Re base alloy that has an atomic ratio of 90 to 10 (Table 1 Specimen 4), which demonstrates good molding without deteriorating the press surface (col. 5 lines 1-3). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use an Ir-Re ratio of 90 to 10, as disclosed by Kuribayashi, in the Ir-Re alloy intermediate layers of Umetani, Epstein, and Hibino in order to prevent deterioration of the pressing surface and to make a good glass optical element without roughening.

Allowable Subject Matter

19. Claims 3, 4, 8, 10, 12, 14, 31, 32, 36, 38, 40, and 42 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

20. The prior art does not teach or fairly suggest methods making a molding die with the maximum and minimum Ni concentrations in the first intermediate layer as claimed, the maximum Cr, Ti, Ta, or Ti-Cr concentrations in second intermediate layer as claimed. Although these metals were commonly used in alloy containing intermediate layers in the prior art, it would not have been obvious to limit the concentrations of Ni at such low levels because doing so make the first intermediate layer harder for grinding and to limit the concentration of the metal in the second layer because doing so would limit the flexibility of utilizing various chemically and thermally stable alloys.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Queenie Dehghan whose telephone number is (571)272-8209. The examiner can normally be reached on Monday through Friday 8:30am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on 571-272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Q.Dehghan

SEAN VINCENT
PRIMARY EXAMINER